

REMARKS

Status of Claims

Claims 1-32 are pending, of which claim 1 is an active independent claim. Claims 1, 3, 5, 6, 9, 12, 14, 16, 20, 22, 24-26 and 32 have been amended to correct informalities in claim language and to more clearly define the intended subject matter. Support for the amendments is found, for example, at page 16, lines 4-8 of the specification. Care has been taken to avoid introducing new matter. Favorable reconsideration of the application in light of the following comments is respectfully solicited.

Objection to the Claims

Claim 6 was objected to because of minor informalities. Applicants respectfully submit that the amendment made to claim 6 overcomes this objection.

Claim Rejection – 35 U.S.C. § 112

Claims 3, 9, 16 and 26 were rejected under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite. Applicants respectfully submit that the amendments made to claims 3, 9, 16 and 26 overcome this rejection.

Claim Rejection – 35 U.S.C. § 102

Claims 1 and 8-22 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,066,399 (Hirano et al.), as evidence by Sheeja et al. *Tribological properties and adhesive strength of DLC coating prepared under different substrate bias voltages*, Wear 249 (2001), pg. 433-439 and Materials Science of Thin Films, Deposition and Structure, Milton Ohring, 2nd Ed., 2004. This rejection is traversed for at least the following reasons.

Applicants respectfully submit that, at a minimum, Hirano fails to disclose that the coated film is formed from “*a carbide, a nitride, an oxide, a carbonitride, an oxycarbide, an oxynitride, or a carbide-nitride-oxide of at least one element selected from IVa-group elements, Va-group elements, VIa-group elements in the element periodic table, Al, B, Si and Ge, or a solid solution thereof,*” as recited by amended claim 1. Hirano discloses a hard carbon thin film, which includes a crystalline hard carbon film and a diamond-like thin film (see, col. 1, lines 42-60 of Hirano), and substantially consists of carbon. Thus, it is clear that the “hard carbon” is different from a carbide, a nitride, an oxide, a carbonitride, an oxycarbide, an oxynitride, or a carbide-nitride-oxide of at least one element selected from IVa-group elements, Va-group elements, VIa-group elements in the element periodic table, Al, B, Si and Ge, or a solid solution thereof. For example, a carbide is a compound of carbon and another element, and thus different from “hard carbon” of Hirano.

As such, it is clear that claim 1 and all claims dependent thereon are not anticipated by Hirano. It should be noted that Sheeja and Ohring are cited to show the distribution of the compressive stress, and fail to disclose the above identified features of claim 1. Thus, it is requested that the Examiner withdraw the rejection of claims 1 and 8-22 under 35 U.S.C. § 102(b).

Claim Rejection – 35 U.S.C. § 103

Claims 2-32 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Hirano et al., in view of Sheeja et al., as evidenced by Ohring. This rejection is traversed for at least the following reasons.

Applicants incorporate herein the arguments previously advanced in traversal of the rejection under 35 U.S.C. § 102(b) predicated upon Hirano. As set forth above, the additional

cited references do not teach or suggest the materials recited by amended claim 1, from which claims 2-32 depend, which are missing from Hirano. Therefore, any combination of the cited references would still fail to disclose the claimed features, and it would not have been obvious to add these features to any such combination of the cited references.

The coated film in the present disclosure is different in an application from the hard carbon thin film of Hirano. Specifically, the present disclosure is directed to a “cutting tool,” whereas Hirano relates to “shaver blades.” Therefore, it would not be obvious for a person skilled in the art to apply Hirano’s technology for shaver blades to the surface coating for the cutting tools which requires excellent toughness, wear resistance and film chipping resistance. Hirano does not disclose or suggest the feature that such strength distribution of the stress is suitable for the cutting tool. Further, Hirano is silent about the effect of suppressing development of cracking during cutting and to improve toughness as disclosed in the present application. It is noted that because the thin film of Hirano is formed of what is called DLC (Diamond-like-Carbon) and DLC is used in sliding parts, protective coatings and functional thin films (see, column 1, lines 10 to 20 of Hirano). In such applications, repeated mechanical impact as large as 2~3GPa during cutting or repeated thermal shock as high as 1000°C is not applied. Basically, DLC is oxidized at a temperature around 300°C in the atmosphere. As DLC is thus not a material suitable for the cutting tool of ferrous materials, it would not have been obvious to modify Hirano to arrive at the present subject matter because there is no motivation or suggestion to do so.

Based on the foregoing, it is requested that the Examiner withdraw the rejection of claims 2-32 under 35 U.S.C. § 103(a).

Conclusion

Having fully responded to all matters raised in the Office Action, Applicants submit that all claims are in condition for allowance, an indication for which is respectfully solicited. If there are any outstanding issues that might be resolved by an interview or an Examiner's amendment, the Examiner is requested to call Applicants' attorney at the telephone number shown below.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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